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I'LL TAKE THE BENEFITS IF YOU PAY THE COSTS: WEIGHING THE EQUITIES OF PUBLIC AND PRIVATE FUNDING SOURCES FOR HYDROELECTRIC DAM DECOMMISSIONING

Dominique R. Scalia*

"All the rivers run into the sea; yet the sea is not full…" Ecclesiastes 1:7

INTRODUCTION

The passage of the Federal Water Power Act in 1920[1] marked the beginning of Congress' commitment to private development of hydroelectric power on navigable rivers.[2] Licenses for hydroelectric dams[3] were authorized, and "[u]tilities responded by investing in hydro. In the next five decades, public and private reservoir storage capacity grew from about forty million acre feet to 450 million acre feet."[4] In the zeal to take advantage of this opportunity, both public and private entities have built many dams that have created a host of detrimental impacts on their environments. These dams have negatively affected water quality, flood patterns, and the habitats of threatened and endangered wildlife, such as the many varieties of salmon that once occupied Washington's Elwha River in abundance.[5] In some of these cases, it has since been determined that the costs (including non-economic environmental costs) of continued dam operation are greater than the benefits, and that the dams

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[1] It became part of the Federal Power Act in 1935.
[2] Dan Tarlock, *Hydro Law and the Future of Hydroelectric Power Generation in the United States*, 65 VAND. L. REV. 1723, 1731 (2012).
[3] These dams produce power by allowing the gravitational force of falling water to turn the blades of a turbine in an electric generator (where in coal or nuclear power plants, it is steam that turns the turbine).
[4] Tarlock *supra* note 2 at 732.
[5] *See generally* DEP'T OF THE INTERIOR ET AL., THE ELWHA REPORT: RESTORATION OF THE ELWHA RIVER ECOSYSTEM & NATIVE ANADROMOUS FISHERIES (1994) [hereinafter ELWHA REPORT], *available at* https://archive.org/details/elwhareportresto94nati (last visited Mar. 8, 2014).

should be removed.[6] Once that determination is made, the question arises: who pays for dam decommissioning?[7]

The Federal Energy Regulatory Commission (FERC) oversees the licensing of non-federal hydroelectric dams under authority granted through the Federal Power Act (FPA). Within FERC's authority is the ability to deny renewal to the expired license of an existing dam, or to impose such weighty conditions on a renewal that the dam owner cannot afford to accept the new license.[8] The question of who pays for the consequences of an expired license, however, continues to lack a consistent answer. The FPA, in its present condition, fails to create reliable expectations about the distribution of expenses for the removal of hydroelectric dams and the restoration of affected river systems. As a result, cost distributions are formulated on a piece-meal basis, with government entities making substantial contributions to total costs, but at widely varying rates.[9] The question thus becomes: who *should* pay for dam decommissioning?

Hydroelectric dam owners enjoy up to fifty years per license term[10] of revenue generated by their free use of a river's kinetic energy, along with public subsidies like tax credits for renewable energy.[11] The idea that a dam may have a detrimental impact on its environment is not particularly new. Even in 1834, communities protested the construction of a new dam

[6] *See generally* AM. RIVERS ET AL., DAM REMOVAL SUCCESS STORIES: RESTORING RIVERS THROUGH SELECTIVE REMOVAL OF DAMS THAT DON'T MAKE SENSE xii et seq. (1999) [hereinafter SUCCESS STORIES], *available at* http://www.sustainourgreatlakes.org/Portals/0/pdf/General/SuccessStoriesReport.pdf (last visited Mar. 8, 2014).

[7] Use of the term "decommissioning" in this paper refers to the entire process of shutting down operations, removing the dam, and conducting environmental restoration efforts.

[8] *See* City of Tacoma, Washington v. Fed. Energy Regulatory Comm'n, 460 F.3d 53, 74 (D.C. Cir. 2006).

[9] *See generally* AM. RIVERS, PAYING FOR DAM REMOVAL: A GUIDE TO SELECTED FUNDING SOURCES (2000) [hereinafter PAYING FOR DAM REMOVAL], *available at* http://www.michigandnr.com/publications/pdfs/Fishing/dams/Paying-Dam-Removal.pdf (last visited Mar. 8, 2014).

[10] 16 U.S.C. § 799 (2006).

[11] For example, Section 1301 of the Energy Policy Act of 2005 extended tax credits to existing hydroelectric facilities that made efficiency improvements or additions to capacity. 26 U.S.C. § 45(c)(8) (2006).

on the Kennebec River in Augusta, Maine for fear that it would destroy wild fish habitat.[12] The Edwards Dam was built anyway, caused an abundance of harm, and later became the first dam removed by order of FERC for the purpose of restoring fisheries (in 1999).[13]

Understanding of the impacts of dams on their environments has only grown since the Edwards Dam was built. Some dams also detrimentally impact cultural resources, such as by flooding sites sacred to local Native American tribes.[14] Lawmakers and administrators are more frequently considering alternatives to re-licensure of existing dams, and dam removal has become an increasingly viable option.[15] Ultimately, that a license term is limited, and that FERC has the sole authority to grant or deny re-licensure is information readily available to all dam owners and potential dam owners. Under the FPA, an unlicensed hydroelectric dam is a trespasser,[16] even if it is has ceased to operate,[17] and the expectation

[12] *A Brief History of Edwards Dam*, NATURAL RES.'S COUNCIL OF ME., http://www.nrcm.org/projects-hot-issues/healthy-waters/edwards-dam-and-kennebec-restoration/a-brief-history-of-edwards-dam/ (last visited Mar. 8, 2014).
[13] *See* Jeff Crane, *"Setting the river free": The removal of the Edwards dam and the restoration of the Kennebec River*, 1 WATER HIST. 131, 131 (2009).
[14] For example, the Tellico Dam on the Little Tennessee River flooded a site known to local bands of the Cherokee Nation as a religious birthplace, as well as an ancient capital and sanctuary. *See* Mark S. Cohen, *American Indian Sacred Religious Sites and Government Development: A Conventional Analysis in an Unconventional Setting*, 85 MICH. L. REV. 771, 783-84 (1987).
[15] The most recent information from American Rivers indicates that more than 925 dams have been removed in the United States over the last 100 years. *Questions About Removing Dams*, AM. RIVERS, http://www.americanrivers.org/initiatives/dams/faqs/ (last visited Mar. 8, 2014). According to the U.S. Army Corp of Engineers National Inventory of Dams (NID), the last five years alone have seen removal of approximately 200 dams solely in the category they have designated "high hazard potential." *National Inventory of Dams Overview*, NID DATA TEAM, 22 (2013), *available at* http://geo.usace.army.mil/pgis/NID2009.downloadFile?InFileName=NIDoverview10May2013.pdf (last visited Mar. 8, 2014) [hereinafter NID OVERVIEW]. This category accounts for less than seventeen percent of all dams included in the NID. *Id.* at 9. The 200 removals account for approximately 1.4 percent of the dams categorized as having high hazard potential. *Id.*
[16] A license is required in order to "construct, operate, or maintain" a dam and other project works for the purposes of developing power. 16 U.S.C. § 817(1) (2006).
[17] Pub. Util. Dist. No. 1 of Pend Oreille Cnty., Washington, 124 FERC 61064 (July 18, 2008).

for that unlicensed dam therefore *should* be simple: it must be removed at the owner's expense.

This article discusses the current state of dam decommissioning, and provides an analysis of the costs and benefits of placing financial liability on various parties. Upon weighing those equities, the fairest solution is for dam owners to take on the costs of future decommissioning. Moving forward, Congress should require FERC to place explicit expectations on dam owners and create a consistent program of cost bearing for private entities. Dam project owners receiving new or renewed licenses should—as a condition of the license—be required to demonstrate ability and commitment to paying the full costs of removing the dam and restoring the river in the future event that the license is not renewed.

This article is not a referendum on dams. It does not contain a cost/benefit analysis of any particular dam, or suggest that any dam should be removed. Every dam is unique—as is every river—and the decision to decommission a hydroelectric project is destined to be a complex one that accounts for factors that this article could not hope to address. With that said, dams are man-made structures with finite lifespans. The day will undoubtedly come for each[18] when the costs of its continued operation—both monetary and non-monetary—will no longer be justified by the benefits. When that day comes, someone will foot the bill for removing the dam; and hopefully someone will also foot the bill for restoring the river on which it resided. This proposal is an answer to the question of who that someone should be.

Part I of this article provides background information to contextualize both the scope and importance of this proposal. Part II explains the present condition of the law surrounding hydroelectric dam decommissioning. Part III evaluates the equities between public and private funding for decommissioning projects, responding to potential counter-arguments and drawing a comparison to the environmental costs

[18] I am making what I think is a safe assumption that no built structure will stand literally forever. To the extent that some dam might truly be repaired in perpetuity, feel free to take this as hyperbole.

of mining activities. Finally, Part IV explains why the ultimate goal of a new lawmaking process governing funding for dam decommissioning should be the requirement that private owners bear the full costs of both removal and restoration.

I. BACKGROUND

A. Dams Versus the Environment

Though it is not the purpose of this article to promote dam removal in its own right, some understanding of the environmental impact of dams is helpful in seeing the importance of removal of those dams that have outlived their usefulness. The presence of a dam affects its river's ecosystem at all levels. Physical alteration of the river caused by dams and their resulting reservoirs can directly cause the destruction of habitats and plant-life, in addition to the degradation of water quality and changes to water yield.[19] In part due to rotting vegetation, reservoirs "may account for between 1 percent and 28 percent of the global warming potential of [greenhouse gas] emissions."[20] Changes in water flow cause varied water temperature, which in turn can decrease the presence of native fish populations.[21] Fish are also harmed by increased concentration of gasses near a dam's spillway, diseases from non-native species that are invited by the newly changed environment, loss of habitat due to the reduction of downstream sediment, and the physical barrier to migration of the dam itself.[22] Similarly dramatic impacts can also be seen throughout the river's floodplain, affecting riparian forests, agricultural lands, and the animals living there.[23]

These tremendous impacts on the environment surrounding a dam are no less significant for the people nearby. One poignant example is the Elwha S'Klallam tribe, who

[19] *See* THE WORLD COMM'N ON DAMS, DAMS AND DEVELOPMENT: A NEW FRAMEWORK FOR DECISION-MAKING 75 (2000*), available at* http://www.internationalrivers.org/files/attached-files/world_commission_on_dams_final_report.pdf (last visited Mar. 8, 2014).
[20] *Id.* at 75-77.
[21] *Id.* at 78-79.
[22] *Id.* at 80-82.
[23] *Id.* at 83.

> lived in and utilized the Elwha River basin for thousands of years. Villages and fish camps, archaeological treasures, traditional cultural properties, tribal history and tribal culture are all integrally connected to the watershed and river system. Because it was the heart of the culture and the economy, the whole river is a cultural resource.[24]

When the Elwha and Glines Canyon Dams were built in 1913 and 1927, they blocked fish migration and flooded traditional fishing grounds.[25] "The majority of [the Tribe's] known archaeological and ethnographic resources [were] … either inundated or buried by the silt that . . . accumulated behind the dams."[26] The ongoing process of removing both the Elwha and Glines Canyon Dams has begun to restore both the fisheries and the cultural resources that were lost to the projects.[27]

B. Prevalence of Hydroelectric Amongst All U.S. Dams

Of all the dams in the United States that may be posing environmental hazards, very few actually have the added benefit of producing renewable energy. There are at least 87,359 dams in the United States,[28] not including small dams that do not meet the minimum size requirements to be included in the U.S. Army Corp of Engineers' National Inventory of Dams (NID).[29] Only 2,209 of the dams in NID are

[24] ELWHA REPORT, *supra* note 5, at 20. Do not be mislead by the Secretary's use of past tense in this report; the Tribe is still living along the Elwha and remains heavily involved in restoration.
[25] *Id.* at 9-10.
[26] *Id.* at 122.
[27] For an ongoing account of the restoration process, *see Dam Removal Blog*, NAT'L PARK SERV., http://www.nps.gov/olym/naturescience/damremovalblog.htm (last visited Mar. 8, 2014).
[28] It is also worth noting that new dam construction has been on the decline since the 1960s. Of the total dams catalogued in NID, 19,768 (22.6 percent) were completed between 1960 and 1969. NAT'L INVENTORY OF DAMS, http://geo.usace.army.mil/pgis/f?p=397:5:0::NO (last visited Apr. 1, 2014). Since that time, completions have declined every decade. *Id.* While this suggests that the scope of the issue is becoming more finite, it also indicates that we are currently—five decades after the peak years for dam completions—facing the height of re-licensure applications.
[29] NAT'L INVENTORY OF DAMS, http://geo.usace.army.mil/pgis/f?p=397:1:1474693368669801::NO::: (last visited Dec. 8, 2013) [hereinafter NID]. The NID includes dams that are at least twenty-five feet in

used primarily for hydroelectric power[30]—about 2.5 percent. American Rivers estimates that only about 2,300 dams are subject to FERC regulation.[31] For dams not governed by FERC, most are regulated by the states in which they are located.[32] Given that lack of centralized oversight for non-FERC dams, a focus on hydroelectric projects provides an avenue for change that would affect dams and rivers nationwide. Admittedly, that means the proposal would affect a relatively small percentage of all dams within the United States. There is no reason, however, that similar schemes could not be enacted at the state-level in order to encompass a greater percentage of the dams that may ultimately be removed.

C. Three Stages of a License

There are three stages of dam licensing that each present a different set of equities: pre-license, existing license, and license renewal. First, for dam projects that exist only in concept, and for which owners are seeking a new original license, the imposition of new requirements creates relatively few equitable concerns. Because there is no reliable funding scheme, there are no relied-upon expectations of public support or federal funding assistance that cause this proposal to seem particularly unfair.

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height with more than fifteen acre-feet of storage, or more than six feet in height with at least fifty acre-feet of storage. It also includes smaller dams if they have "high" or "significant" hazard classifications. NID. The total number of dams, including smaller dams not included in NID, is likely very high. The National Research Council estimated in 1992 that there were over 2.5 million dams in the United States. NAT'L RES. COUNCIL, RESTORATION OF AQUATIC ECOSYSTEMS: SCIENCE, TECHNOLOGY, AND PUBLIC POLICY 26 (1992).

[30] NID, *supra* note 29, at *NID National*.

[31] SUCCESS STORIES, *supra* note 6. Note that only dams used to produce hydroelectric power are subject to FERC's regulatory authority, though there is no requirement that hydroelectric power be the only or even the primary purpose of the dam. This would mean that more than the 2,209 dams used primarily for hydroelectric power would fall under FERC's authority. However, FERC oversees only non-federal dam projects, meaning that some of those 2,209 dams would also be excluded. According to NID, sixty-five percent of the inventoried dams are privately owned. NID OVERVIEW, *supra* note 15, at 11.

[32] *Dam Safety Regulation in the U.S.*, ASS'N OF ST. DAM SAFETY OFFICIALS, http://www.damsafety.org/news/?p=95446bff-9706-419b-917e-f0758fc37e74 (last visited Mar. 8, 2014). However, American Rivers notes that under the varying state regulatory schemes, many dams remain entirely unregulated due to such disqualifications as small size. *See* SUCCESS STORIES *supra* note 6, at xi.

The explicit requirement of decommissioning funding will simply be one of many prospective conditions on the license. This proposal should therefore apply to pre-license projects with full force.

Second, for mid-stream dam projects with existing unexpired licenses, a new requirement for decommissioning funds would be especially hard to swallow. The requirement would alter the agreed-upon terms of the existing license, and may be viewed as an unfair revocation by dam owners who find themselves financially unable to meet the new condition. Although I do think the imposition of funding requirements on existing licensees is defensible, I do not include it in this proposal. Such legislation would surely be more difficult to pass, and it hardly seems necessary when so many licenses are already facing expiration.[33]

Third, for the group seeking license renewal, this new requirement would be the most difficult. These dams were built as many as fifty years ago,[34] and have operated for that long without any expectation that owners would be required to fully fund decommissioning in the future. Owners long ago selected the location they thought would be the most economically viable, and the imposition of this requirement would change that balance too late for another choice to be made. But as I will argue below, any expectation by a dam owner that their license would be perpetually renewed is not reasonable. Licenses are granted for set terms not exceeding fifty years,[35] and any cost/benefit analysis conducted on the original investment should have at least taken into account the possibility that there would be no renewal. For that reason, and the others set forth below, this proposal should be fully applied to expired licenses seeking renewal.

II. THE END OF A LICENSE

The FPA primarily governs initial licensing and includes relatively little contemplation of the post-license life of a dam and its river. It does, at least implicitly, allow FERC to deny re-licensure directly, or to shut

[33] *See* NAT'L INVENTORY OF DAMS *supra* note 28.
[34] Or even longer, for dams that are currently receiving annual licenses during a prolonged renewal process.
[35] 16 U.S.C. § 799 (2006).

down projects indirectly by imposing conditions on a license that would cause its rejection by the project owner.[36] But the actual procedure for decommissioning a dam that is subject to this kind of decision on the part of FERC is not predetermined by the statute or FERC's regulations—hence the historic lack of consistency with regard to funding.[37]

The most relevant section of the FPA to the post-license life of a dam is the provision for condemnation by a government.[38] Rather than producing a bill to the project owner for the government's subsequent efforts in dealing with the dam, this process requires the licensee be compensated for the government take-over.[39] It is possible that cost sharing for restoration could be imposed on the licensee in this situation, but that is not a settled question.[40] There is one situation, however, in which FERC regulations do require restoration by a licensee: voluntary surrender of a license for a dam that was built on "the lands of the United States."[41] This is a limited circumstance, both because voluntary surrender is only one of several ways that a license can end, and because it fails to capture dams built on private lands.[42] Given the already limited scope of FERC's authority, small and specific provisions like this one are inadequate[43] and this proposal seeks a much more comprehensive solution.

[36] City of Tacoma, Washington v. Fed. Energy Regulatory Comm'n, 460 F.3d 53, 74 (D.C. Cir. 2006). The FPA also allows revocation of a current license under limited circumstances. 16 U.S.C. § 799 (2006).
[37] *See* PAYING FOR DAM REMOVAL, *supra* note 9.
[38] 16 U.S.C. § 807 (2006).
[39] *Id.*
[40] *City of Tacoma, Washington v. Fed. Energy Regulatory Comm'n*, 460 F.3d at 74.
[41] 18 C.F.R. § 6.2 (2012).
[42] The phrase "lands of the United States" is not specifically defined, but appears to include lands held in trust for Indian tribes. *See, e.g.*, *Lake Superior District Power Company, Project No. 1440, Order Granting Application for Surrender of License*, 59 F.P.C. 1497 (Aug. 3, 1977). The most frequent use of this provision is for dams located within a National Forest. *See, e.g.*, *Pub. Util. Dist. No. 1 of Pend Oreille County, Washington*, 142 FERC 62232 (Mar. 22, 2013).
[43] This is especially true given the reality that some dam owners come to surrender a license in the face of insolvency, and therefore cannot practically be compelled to pay restoration costs despite the single provision that may other require it. *See, e.g.*, *Sales Hydro Associates*, 86 FERC 61101 (Feb. 2, 1999).

Ultimately, there remain many licensees that do not bear the full costs of removal and restoration when their dams are decommissioned. Precise information about dam removal funding packages is hard to come by.[44] But, in one case study of twenty-five dam removals,[45] American Rivers found that "federal and state governments together provided over fifty-eight percent of the total costs for each dam removal across all the projects studied."[46] Not all of the dams in the study were privately owned, so it is not possible to know exactly how much public funding went into private projects.[47] However, it is clear that each funding package studied was unique, and that negotiation about funding amongst all stakeholders—both public and private—remains an important step in the decommissioning process under current practices.[48]

III. EVALUATING THE EQUITIES

A. The Cost of Dam Removal

As a prelude, keep in mind that it is impossible to answer the question, "how much does it cost to decommission a dam?" As noted by American Rivers, the total cost will include much more than the mere process of demolition.[49] There are also potentially large expenses associated with project planning and analysis (including surveys,

[44] PAYING FOR DAM REMOVAL, *supra* note 9, at 17.
[45] SUCCESS STORIES, *supra* note 6. The organization cautions against using the data for more than general observations," given the small sample size. PAYING FOR DAM REMOVAL, *supra* note 9, at 17.
[46] PAYING FOR DAM REMOVAL, *supra* note 9, at 18.
[47] It may also be the case that even private funding for certain dam removal projects comes at an expense to governments, by way of settlement agreements in which the private funder receives certain benefits for removing the dam. For example, upriver dam owners and a downstream shipbuilder funded removal of the Edwards Dam on the Kennebec River; but in exchange, the upriver dam owners received delay in their own fish passage obligations and the shipbuilder received mitigation for expanded operations. SUCCESS STORIES, *supra* note 6, at 61.
[48] Washington's Elwha River provides an interesting (though as always, not widely representative) example of the negotiation process for dam removal. This removal was affected not through a FERC relicensing application, but by an act of Congress. In 1992, Congress passed the Elwha River Ecosystem and Fisheries Restoration Act, which allowed up to $29.5 million dollars to be provided for the acquisition and removal of both the Elwha and Glines Canyon dam projects, along with environmental restoration of the Elwha River. Pub. L. No.102-495, 106 Stat. 3173 § 3(b) (Jan. 3, 1992).
[49] PAYING FOR DAM REMOVAL, *supra* note 9, at 22 et seq.

ecological impact evaluation, sediment analysis, design and engineering, and required permits), field work (including the deconstruction, but also sediment management, infrastructure repair and replacement, site restoration, and historic and archaeological monitoring and documentation), and subsequent monitoring.[50] The cost of this work will surely vary widely from project to project. Even the cost of removal itself is difficult to predict. Examining twenty-three of the dams studied by American Rivers in 1999,[51] the highest cost of removal for any of the projects was about $5 million.[52] The lowest was $14,551.[53] The average cost of removal for the twenty-three dams was $850,138.[54] Suffice it to say, the total costs of dam decommissioning will be heavily dependent on the unique characteristics of the dam, the river, and the overall plan (including method of dam demolition and the amount of restoration that will be performed).

That the cost of decommissioning a dam is so unpredictable can be a frightening prospect. Telling a potential new dam builder that they will have to pay a largely unknowable amount of money at a largely unknowable future date might seem unfair. We may fear that placing that burden on a potential new project will deter the would-be owner from building the dam to begin with. Or, we may fear that the owner will build the dam anyway, and ultimately shirk its responsibility in the end. All of these are legitimate concerns. None of these are sufficient reasons not to impose responsibility on dam owners through a legislative requirement that they pay these costs at the end of a dam's life in order to obtain a new or renewed license.

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[50] *Id.*
[51] *See generally* SUCCESS STORIES, *supra* note 6. Two of the projects in the report are not included in my analysis because they were not complete at the time the study was published. One project is not included because the cost of removal was unknown. One project is not included because it encompassed removal of several project works without distinct costs. In addition, the 1973 removal of the Fort Edward Dam in New York was not included because American Rivers did not count this removal as a "success." It was included in an appendix to provide dam removal lessons.
[52] All figures have been adjusted for inflation. *See infra* Appendix I for inflation adjustment calculations on all 23 projects.
[53] *See infra* Appendix I.
[54] *See infra* Appendix I.

B. Requiring Payment of Unpredictable Costs is Not Unfair: It's Unavoidable

To place a new requirement on existing and potential dam owners that they agree to pay an unknown cost in the future may strike those owners as inherently unfair. A dam licensee would be required to agree to a condition that it could not possibly understand in its entirety—something that may look unconscionable in certain contexts. How can the dam owner negotiate its position and evaluate its investment when the terms being imposed by FERC cannot be quantified?

The answer may just have to be that the dam owner will embark upon its venture with less certainty. The cost of decommissioning the dam—and when that might happen—is simply unknowable. But it isn't just unknowable to the dam owner; it's unknowable to us all. In fact, a current or potential dam owner is in the best possible position of any stakeholder to evaluate these issues. It knows more than anyone about what its own project costs are likely to be. The dam owner has the best available information about what the operation of the dam will look like after it is built, including how much power will be generated and how much it can charge for that power. It knows its own plans for maintaining the dam, meaning it has the best information about how safe the dam will be and how long it will last. If the dam owner is told that in the future it must pay to decommission the dam, it can prepare for that certainty by setting money aside, charging higher rates, or choosing not to build the dam at all.

If requiring a dam owner to commit to future payment for decommissioning is unfair, it is even less fair not to do so. Failing to impose this requirement on dam owners across the board means that a burden is being placed on other parties who have even less information about the dam than the dam owner. That includes any government, non-profit corporation, and individual taxpayer that will ultimately share the costs for decommissioning.[55] Not only do these parties have access to

[55] American Rivers provides a long list of possible funding sources for dam removals. PAYING FOR DAM REMOVAL, *supra* note 9, at 5 et seq. It includes grants from federal and state programs, general budgets of agencies, and specific appropriations of federal and

less information than the dam owner (or at least no more) when the dam was built, but they didn't even know that they should expect to be faced with *any* cost for decommissioning—because there is currently no predictable scheme for funding that process.

Imposing a condition at the very beginning of the license regarding payment for decommissioning is not really a change. As it stands, the grant of a new or renewed license already carries with it the eventuality that decommissioning will be required at some unknown cost. Currently, that burden is placed on an ever-changing mixture of many public and private entities. They have no idea how much they will ultimately pay, or even whether they will pay anything. This proposal solidifies expectations as much as is possible by placing the burden on the one party in the best position to quantify and prepare for it.

C. If the Conditions Leads to Fewer Dams, That's Okay

Industry and business interests opposing new restrictions or requirements may argue in the form of this threat: if you make my business less appealing, I'll just get out of it. This may be accompanied by some prediction of harm to a community, like fewer jobs, or perhaps in this case, less of that good, cheap hydropower. Dam owners may argue that some hydroelectric projects are already bordering on non-profitability, and that the imposition of new expenses like the one proposed here would make more dams less likely to ever be built. The World Commission on Dams might support that argument, with indications that many dam projects are subject to large cost overruns in construction, and that many fail to meet profit goals.[56]

By and large, there is no great retort to this argument. It is true that imposing this condition could possibly deter some would-be dam owners from building new projects. But while hydroelectric power is a useful component of our overall energy portfolio, this doesn't mean we should

state legislatures, local government funding, and private sector funding from sources like dam owners, nonprofit organizations, and private donors. *Id.*

[56] THE WORLD COMM'N ON DAMS, DAMS AND DEVELOPMENT: A NEW FRAMEWORK FOR DECISION-MAKING 39, 49 (2000), http://www.internationalrivers.org/files/attached-files/world_commission_on_dams_final_report.pdf (last visited Apr. 1, 2014).

accept the present condition of decommissioning cost sharing in order to maximize the existence of dams. From January through September 2013, hydroelectric power accounted for about seven percent of total power generated in all sectors (residential, commercial, industrial, and transportation) in the United States.[57] That is thirty-six percent of the energy from renewable sources, which in total provided nineteen percent of energy from all sources. [58] Although hydroelectric is the top energy source among the renewables, it is far from the only.

If the imposition of this condition makes a particular dam project appear non-viable, then it is because the projected costs for that dam have become more accurate. Failing to impose responsibility on dam owners from the beginning of a license doesn't mean that the cost doesn't exist; it merely means it isn't being included in that owner's evaluation of the potential costs and benefits of the project. The current scheme allows dam investors to ignore significant risks and costs during initial assessments of project viability. Those investors should be required to evaluate all of the burdens and plan for decommissioning from the outset. That requirement might mean a dam does not get built, but perhaps that's because it *shouldn't* be built.

D. Do Not Be Deterred By a Threat of Corporate Misbehavior

While licensees might agree to a vague requirement for decommissioning in the distant future, it is another thing to actually pay the bill when it comes due. We may be afraid that a corporation facing massive expenses—and no more profits—will cut and run. Maybe the corporation will dissolve, leaving no one to be held accountable. Or maybe it will just file for bankruptcy after spending fifty years distributing

[57] U.S. ENERGY INFORMATION ADMINISTRATION, ELECTRIC POWER MONTHLY WITH DATA FOR SEPTEMBER 2013, at 12, tbl.ES.1.B (Nov. 2013), http://www.eia.gov/electricity/monthly/current_year/november2013.pdf (last visited Apr. 1, 2014).

[58] *Id.* In addition to hydroelectric, "renewable" includes solar, geothermal, biomass (including wood and wood-derived fuels, as well as "other biomass"), wind, and "other renewables." The top source of power remains coal, at thirty-nine percent for the same period. *Id.*

its profits, leaving insufficient funds to properly remove the dam and restore the environment.

To some extent, the law already provides safety nets for situations like these. Laws governing corporations prohibit various forms of misbehavior, create rules governing dissolution, and even allows individual liability of owners in certain cases (e.g. fraud).[59] Bankruptcy law provides for recuperation of payments made to defraud creditors, or within a certain amount of time prior to filing for bankruptcy protection.[60] And to whatever extent existing law does not protect against bad behavior by dam owners that would allow them to avoid their liabilities for decommissioning expenses, it should.[61] New legislation providing for this proposed requirement could add such protections (for example, by creating some manner of priority status in a bankruptcy, or requiring individual liability for decommissioning).[62] Or, such protections could be separately considered as corporate and bankruptcy laws evolve. In either case, there is no reason that a fear of bad behavior by dam owners should deter us from creating a reliable scheme of funding for decommissioning.

Further, the opportunity to avoid liability—by way of dissolution, bankruptcy, or otherwise—could be minimized by requiring financial assurance greater than a mere promise. A dam licensee can be required to pay a bond, obtain insurance, or otherwise demonstrate actual ability to pay. Such a system would bring this proposal in line with some of the more successful environmental regulations already in place for other industries, as discussed in the following section with regard to mining.

[59] *See* Fletcher v. Atex, 68 F.3d 1451, 1457 (1995) (regarding corporate "veil-piercing").
[60] *See, e.g.*, 11 U.S.C. § 550 (2006). As a general matter, though, both corporate and bankruptcy law are beyond the scope of this paper. These should be taken only as examples of the kinds of protection that may be provided already by various laws.
[61] It is difficult to say whether the existing law does already offer such protections because the liabilities that a dam owner might seek to avoid aren't currently being imposed with any regularity or reliability.
[62] This is yet another element of a new rule that could be accomplished through legislation but not by a FERC rulemaking.

E. A Comparison: Mine Decommissioning Bonds

Requiring financial assurances from parties in a position to cause environmental harm is not a new concept. Such assurances are already required in a variety of settings: e.g. ships carrying hazardous cargo, nuclear power plants, and mines.[63] This is, at least in part, a response to the very concerns discussed in the previous section: evasion of obligations by bankruptcy, dissolution, or simple abandonment.[64] Prospective liability like that proposed here is well positioned to address these concerns by creating expectations early on, and hopefully deterring excess environmental damage that would reduce restoration costs down the road[65] (as opposed to retroactive liability, which faces various problems[66]).

The need for environmental restoration—and the desirability of ensuring it is paid for through prospective assurances—can be seen in the effects of mining. Visit Butte, Montana, for example, and you cannot help but notice that massive Superfund site knows as the Berkeley Pit—a former open-pit copper mine that operated from 1955 to 1982.[67] In addition to, arguably, being a terrible eyesore, the pit is now filled with toxic waste that was even blamed for the death of 342 migrating snow geese that had the misfortune of landing upon it.[68]

Congress addressed a different sector of the mining industry in 1977 by passing the Surface Mining Control and Reclamation Act (SMCRA), bolstered by the powerful images of long-burning mine fires, the Buffalo Creek mining disaster, and the ubiquitous landslides and acid

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[63] JAMES BOYD, FINANCIAL RESPONSIBILITY FOR ENVIRONMENTAL OBLIGATIONS: ARE BONDING AND ASSURANCE RULES FULFILLING THEIR PROMISE? 2 (2001), *available at* http://www.rff.org/rff/Documents/RFF-DP-01-42.pdf (last visited Apr. 1, 2014).
[64] *Id.*
[65] *Id.*
[66] *See id.* at 9, 34-35.
[67] *Berkeley Pit*, MONT. OFFICIAL ST. TRAVEL SITE (2010), http://visitmt.com/listing/categories_NET/MoreInfo.aspx?IDRRecordID=11138 (last visited Apr. 1, 2014).
[68] Duncan Adams, *Did toxic stew cook the goose?*, HIGH COUNTRY NEWS (Dec. 11, 1995), http://www.hcn.org/issues/49/1520 (last visited May 20, 2014). *See also The Berkeley Pit: New fungal bacterial species call this deadly lake home*, ATLAS OBSCURA (2013) http://www.atlasobscura.com/places/berkeley-pit (last visited May 20, 2014).

runoff of eastern coal mines.[69] SMCRA requires applicants for surface coal mining and reclamation permits to file a bond that will cover the costs of the reclamation plan "if the work has to be performed by the regulatory authority in the event of forfeiture"—at least $10,000 per permit.[70] Bonds of this type are still not an absolute guarantee. Unexpected conditions can cause reclamation costs to exceed the bond amount more quickly than regulators can require bond adjustments.[71] It is also possible to lose bonds to surety insolvency if large numbers of mining companies default—as occurred in the 1980s.[72] Creative solutions can be (and have been) developed to some of these problems, leaving such bonds as regulators' best guarantee of ultimate site reclamation.[73]

SMCRA provides a fairly common-sense approach to prospectively funding environmental restoration at the end of a project's life. The bond approach is fair: it puts the cost of repairing environmental damage on the party that caused it, and it makes the liability known up front so it can be included in every stage of planning for a new project. It does the best possible job of preventing evasion of liability by requiring payment at the beginning of the project. And it doesn't seem to have caused the annihilation of the coal-mining industry. Mine owners are capable of making the financial assurance thanks to the availability of surety bonds.

A bond requirement would be one good way to carry out the proposal offered here for hydroelectric dams. At the time of application for a new or renewed license, dam owners and FERC would engage in the process of evaluating potential future expenses for decommissioning. A bond for that amount would then be required as a condition of the license. The requirement need not be applied retroactively to existing licenses, just

[69] *See generally* Pub. L. No. 95-87, 91 Stat. 445 (Aug. 3, 1977).
[70] 30 U.S.C. § 1259(a) (2006). SMCRA also requires regular payment of reclamation fees by coal mine operators. 30 U.S.C. § 1232 (2006). In addition to federal requirements, SMCRA has also had a significant impact on state-level regulation of coal mines. The imposition of performance standards meant changes in state permitting procedures, which have led to improved administration and stricter enforcement. *See* Courtney W. Shea, *Coal Mining and the Environment: Does SMCRA Give Regulators Appropriate Enforcement Tools?*, 8 SPG NAT. RESOURCES & ENV'T 17, 17-18.
[71] *Id.* at 18.
[72] *Id.*
[73] *Id.*

as SMCRA makes exceptions for certain existing coal rights.[74] This should address concerns over unfairness for existing dam owners who accepted their current licenses without bond conditions. Only owners who are not currently licensed (or are facing expiration of their license) will be required to file bonds, meaning the new or renewed license will not ever be accepted until this requirement is understood and met.

This system also addresses some concerns over the uncertainty of future decommissioning costs. While a comprehensive system should allow for future adjustment of bond amounts in the event of changed conditions, a licensee will at least know at any given time the full amount of its liability. The drawback of this aspect, as noted with regard to mining, is that the bond could ultimately fail to cover the full costs of decommissioning if conditions change unexpectedly too close to the end of a license. Any legislative scheme would need to fully consider the pros and cons of this and other options, but the increased security of a bond may be a bargaining chip that would appeal to dam owners when faced with the prospect of an unknowable amount of future liability.

F. Legislation Versus Rulemaking

It may be that FERC already has the authority to require dam owners to commit to funding decommissioning as a condition of their license. Congress has made explicit that FERC *shall* consider "the protection, mitigation of damage to, and enhancement of, fish and wildlife (including spawning grounds and habitat) . . . and the preservation of other aspects of environmental quality" when deciding whether or not to issue a license.[75] On arguably even less-explicit authority,[76] the U.S. Department of Agriculture promulgated regulations in 1974 designed to reduce environmental harm from mining on national forest land by requiring the

[74] *See generally* Paul Upsons, *Valid Existing Rights Under the SMCRA and Takings Implications*, 25 COLO. LAW 2405 (1993).
[75] 16 U.S.C. § 797(e) (2006).
[76] "The Secretary of Agriculture . . . may make such rules and regulations and establish such service as will insure the objects of [the public forests and national forests], namely, to regulate their occupancy and use and to preserve the forests thereon from destruction . . . ." 16 U.S.C. § 551 (2006).

submissions of operation plans and bonds[77] (subsequently upheld by the Ninth Circuit[78]). But as discussed in Section E above, other mining bond requirements were passed shortly thereafter through legislation,[79] suggesting at least that both paths are potentially useful options.

There are some advantages to legislation that make it particularly appealing for this proposal. The first is that it avoids the kind of litigation that often follows [especially unpopular] rulemaking, allowing FERC to avoid the time and expense of defending its own ability to regulate. Second, legislation can address funding questions that administrative rulemaking cannot—for even a plan that places financial burden on industry will not come without any cost to government.[80] Finally, legislation on this proposal would definitively accomplish a goal at which FERC is currently failing. If it is true that FERC has this power already, then it is especially noteworthy that it does not exercise it. Perhaps legislation is simply a necessary shove in the right direction for an agency pulling its punches.[81]

CONCLUSION

Despite all the environmental danger, it would be unfair not to acknowledge that the public experiences benefits from the existence of hydroelectric dams. They allow us to enjoy reduced carbon emissions,

[77] National Forests Surface Use Under U.S. Mining Laws, 39 Fed. Reg. 31317-01 (Aug. 28, 1974). The present codification of these requirements can be found at 36 C.F.R. § 228 (2012).
[78] U.S. v. Weiss, 642 F.2d 296 (9th Cir. 1981).
[79] *See infra* Part IV.e.
[80] In addition to the most basic expenses of implementing and enforcing the new requirements, legislation could also provide creative funding solutions for those decommissioning projects that are not covered by this proposal. That may include, for example, even those hydroelectric dams that *should* be covered but for which decommissioning funding is ultimately not forthcoming due to corporate misbehavior or other unfortunate circumstances. *See infra* Part IV.d.
[81] In the end, whether this proposal is accomplished through rulemaking or through legislation is not of tremendous import. Though I believe legislation would likely lead to a more comprehensive solution, I recognize that it may also be a more arduous and lengthy path. Whatever the means, the ends are defensible for all the same reasons, and that shall be my focus from here on out.

cheap power, and even recreational benefits created by reservoirs.[82] Regardless of that admitted public interest, full financial liability for dam decommissioning should remain with dam owners. In reality, even this would not eliminate public cost sharing. Dam owning power companies would know about the liability from the beginning of the license term and would pass on the anticipated expenses to customers in the form of higher rates. But where public cost sharing is inevitable, my proposal places it on the specific members of the public who are also the direct beneficiaries of the positive impact of hydroelectric dams (those in the geographic vicinity of the dam), rather than on the national public at large.

Further, despite the benefits to the local public of hydroelectric dams, the primary benefits continue to redound to the owner. After building a dam, the owner enjoys thirty to fifty years of free use of a river's kinetic energy to produce power for which it can charge its customers. Private dam owners receive distributed corporate profits, not the public. In exchange for the rights that come with ownership, dam owners should also bear the costs of their business. Those costs include the monetary expenses of removing a dam once a license expires and fails to be renewed, as well as the environmental expenses that are caused by the construction, presence, and destruction of the dam—expenses that are not themselves monetary, but that can be mitigated through monetary support for restoration.

At the end of a dam's life, someone will pay these costs. It might be a government (and therefore taxpayers), the environment, or a private donor. But to answer the original question posed: it *should* be the dam owner. Owners are in the best position to predict the costs from the beginning of a project, and should therefore incorporate the expense of decommissioning into cost/benefit analyses and feasibility studies in deciding whether a dam project is a good investment. Owners are also the parties best able to prepare for those expenses through their direct management of hydroelectric dam projects and the direct benefits they reap through their free use of kinetic energy and the rates they charge

[82] *See, e.g.*, *Why Hydro?*, NAT'L HYDROPOWER ASS'N (2014), http://www.hydro.org/why-hydro/ (last visited Mar. 8, 2014).

customers for the power generated thereby. The current scheme of piece-meal funding for decommissioning projects is unpredictable, and places liability unfairly on governments and environments. Congress should remedy these inequities by implementing this proposal, placing a requirement on FERC that it address decommissioning costs from the beginning of a license, and acquire financial assurances from dam owners to ensure that the environmental impacts of hydroelectric projects can be mitigated and remedied at the end of a dam's life, at the sole expense of private owners.

APPENDIX I

2013 Inflation Adjustment[83] for Dam Removal Costs as Presented by *Dam Removal Success Stories: Restoring Rivers Through Selective Removal of Dams that Don't Make Sense*, American Rivers (December 1999).

Baraboo River, Wisconsin – Waterworks Dam: 213,770 (1998) = 306,289.13 (2013)

Bear Creek, Oregon – Jackson Street Dam: 1.2 million (1998) = 1,719,357.06 (2013)

Cannon River, Minnesota – Welch Dam: 46,000 (1994) = 72,490.66

Chipola River, Florida – Dead Lakes Dam: 32,000 (1987) = 65,787.61 (2013)

Clearwater River, Idaho – Lewiston Dam: 633,428 (1973) = 3,331,859.81 (2013)

Clyde River, Vermont – Newport No. 11 Dam: 550,000 (1996) = 818,676.23 (2013)

Colburn Creek, Idaho – Colburn Mill Pond Dam: 15,000 – 30,000 (1999) = 22,500 (1999) = 31,541.33 (2013)

Cold Creek, California – Lake Christopher Dam: 60,000 – 100,000 (1994) = 80,000 (1994) = 126,070.72 (2013)

Conestoga River, Pennsylvania – (Seven Dams): 1,500 – 110,000 (1997 – 1999) = 55,750 (1998) = 79,878.46 (2013)

Evans Creek, Oregon – Alphonso Dam: 55,000 (1999) = 77,101.02 (2013)

Juniata River, Pennsylvania – Williamsburg Station Dam: 150,000 (1996) = 223,275.33 (2013)

Kennebec River, Maine – Edwards Dam: 2.1 million (1999) = 2,943,857.14 (2013)

Kettle River, Minnesota – Sandstone Dam: 208,000 (1995) = 318,750.45 (2013)

[83] *Consumer Price Index (CPI) Inflation Calculator*, Bureau of Labor Statistics (2013), http://www.bls.gov/data/inflation_calculator.htm (last visited Apr. 1, 2014).

Little Miami River, Ohio – Jacoby Road Dam: 10,000 (1997) = 14,551.15 (2013)

Milwaukee River, Wisconsin – Woolen Mills Dam: 86,000 (1988) = 169,779.85 (2013)

Neuse River, North Carolina – Quaker Neck Dam: 205,500 (Dec 1997 – Sept 1998) = 205,500 (1998) = 294,439.90 (2013)

Ouzel Creek, Colorado – Bluebird Dam: 1.5 million (1989 – 1990) = 1.5 million (1990) = 2,680,329.00 (2013)

Santa Fe River, New Mexico – Two-Mile Dam: 3.2 million (1994) = 5,042,828.61 (2013)

Souadabscook Stream, Maine – Grist Mill Dam: 56,000 (1998) = 80,236.66 (2013)

Walla Walla River, Oregon – Marie Dorian Dam: 30,000 + 15,000 (1997) = 45,000 (1997) = 65,480.19 (2013)

Whitestone Creek, Washington – Rat Lake Dam: 52,000 (1989) = 97,938.65 (2013)

Willow River, Wisconsin – Willow Falls Dam: 450,000 (1992) = 749,078.40 (2013)

Willow River, Wisconsin – Mounds Dam: 170,000 (1998) = 243,575.58 (2013)

Total: 19,553,172.94 (2013) / 23 = 850,137.95

Highest: 5,042,828.61

Lowest: 14,551.15

[NOTE: For any amounts or years that were given in a range, I used the average.]